

WHAT IS CLAIMED IS:

1. A voltage regulator means circuit for lamps, LED arrays, and lamp and LED array circuit loads comprising, in combination:
 - a. an AC power source means comprising a mains power line of a 115 V AC to 480 V AC power supply and a step-down transformer thereof;
 - b. a voltage sensing means circuit for sensing the output of said step-down transformer comprising a full-wave bridge rectifier circuit to provide a pulsing DC voltage, a spike filter capacitor and a filter capacitor to suppress ripple currents;
 - c. a soft-start lamp filament voltage equalizing means oscillator circuit to limit inrush currents, said soft start oscillator circuit output across the pulsing DC voltage output of said full-wave bridge rectifier circuit of said voltage sensing circuit, said soft start lamp filament voltage equalizing means oscillator circuit comprising a zener diode and a capacitor wherein said equalizing means oscillator circuit controls forward conduction of an input power line triac control for said soft-start lamp filament voltage equalizing means oscillator circuit output, frequency of said oscillator circuit per values of said zener diode, of said capacitor of said equalizing circuit and of zener diode of the DC voltage reference circuit;
 - d. a DC voltage reference means oscillator circuit for providing a DC voltage reference level across said DC voltage equalizing circuit output of said soft-start circuit comprising a zener diode, a transistor, and a current limiter network of two resistors to provide an oscillation process wherein oscillation frequency is per values of said zener diode, said voltage divider and current limiter network of two resistors and said transistor to control conduction of an

AC power line supply control means circuit triac within predetermined voltage level ranges;

- e. an AC mains power line supply control means circuit for regulating voltage output of said 115 V AC to 480 V AC power supply, said circuit across said voltage reference circuit comprising said AC power line supply control means circuit triac, an optoisolator triac driver for coupling between pulsing DC voltage level of said voltage reference circuit and AC voltage level of said AC power source, a capacitor to initiate conduction of said AC power line control supply triac means circuit at start-up, and a resistor to limit current applied to said line control triac.
2. The voltage regulator means circuit of Claim 1 wherein output voltage is regulated to maintain output voltage between 11.0 volts and 12.5 volts.
 3. The voltage regulator means circuit of Claim 1 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit.
 4. The voltage regulator means circuit of Claim 1 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit comprising a a linear type power supply.
 5. The voltage regulator means circuit of Claim 1 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit comprising a switching type power supply containing a pulse-width modulator.
 6. The voltage regulator means circuit of Claim 1 wherein output of said AC power source is an AC voltage.
 7. The voltage regulator means circuit of Claim 1 wherein output of said AC power source is a DC voltage.
 8. The voltage regulator means circuit of Claim 1 wherein said power line control triac is an optoisolator triac driver.

9. The voltage regulator means circuit of Claim 1 wherein said voltage sensing means circuit comprises a full-wave bridge rectifier circuit of four diodes, a spike filter capacitor across output of said full wave bridge rectifier circuit and a filter capacitor across output of said step-down transformer to provide a pulsing DC voltage to said soft start lamp circuit and to said DC voltage reference means oscillator circuit.
10. The voltage regulator means circuit of Claim 1 wherein internal voltage level of said voltage regulator means circuit is determined by component values of said soft start control circuit components and component values of said DC voltage reference means oscillator circuit components.
11. The voltage regulator means circuit of Claim 1 wherein voltage output of said 115 V AC to 480 AC power supply is regulated to maintain a 11.0 to 12.5 V AC based upon an internal voltage level of said voltage reference means oscillator circuit.
12. The voltage regulator means circuit of Claim 1 wherein output voltage of said 115 V AC to 480 V AC power supply is regulated to maintain an output voltage of 11.6 volts, within the range of from 11.0 to 12.5 volts.
13. A low voltage power supply source providing a low voltage within the range of from 11.0 to 12.5 V AC wherein a voltage regulator circuit provides a linear output response to input power variations and load changes of said low voltage power supply source, to keep said low voltage power supply source voltage output constant within the range of from 11.0 to 12.5 V AC, said low voltage power supply source comprising, in combination:
 - a. an AC power source comprising a mains power line of a 115 V AC to 480 V AC power line supply source and a step-down transformer thereof;
 - b. a voltage regulator means circuit for lamps and lamp loads wherein said voltage regulator means circuit senses output voltage of said transformer of said power line supply source, measures said output voltage against an

internal DC reference voltage, operates to reduce voltage output of said transformer to match internal DC reference voltage by reducing input power line voltage to power line supply source transformer and operates to limit inrush currents experienced by said power supply source to reduce thermal shock to lamp filaments of incandescent lamps and lamp loads, and LED arrays and LED array loads.

14. The low voltage power supply source of Claim 13 comprising, in combination:
 - a. an AC power source means comprising a mains power line of a 115 V AC to 480 V AC power supply and a step-down transformer thereof;
 - b. a voltage sensing means circuit for sensing the output of said step-down transformer comprising a full-wave bridge rectifier circuit to provide a pulsing DC voltage, a spike filter capacitor and a filter capacitor to suppress ripple currents;
 - c. a soft-start lamp filament voltage equalizing means oscillator circuit to limit inrush currents, said circuit output across the pulsing DC voltage output of said full-wave bridge rectifier circuit of said voltage sensing circuit, said soft start lamp filament voltage equalizing means oscillator circuit comprising a zener diode and a capacitor wherein said equalizing means oscillator circuit controls forward conduction of an input power line triac control for said soft-start lamp filament voltage equalizing means oscillator circuit output, frequency of said oscillator circuit per values of said zener diode, of said capacitor of said equalizing circuit and of zener diode of the DC voltage reference circuit;
 - d. a DC voltage reference means oscillator circuit for providing a DC voltage reference level across said DC voltage equalizing circuit output of said soft-start circuit comprising a zener diode, a transistor, and a current limiter

network of two resistors to provide an oscillation process wherein oscillation frequency is per values of said zener diode, said voltage divider and current limiter network of two resistors and said transistor to control conduction of an AC power line supply control means circuit triac within predetermined voltage level ranges;

- e. an AC mains power line supply control means circuit for regulating voltage output of said 115 V AC to 480 V AC power supply, said circuit across said voltage reference circuit comprising said AC power line supply control means circuit triac, an optoisolator triac driver for coupling between pulsing DC voltage level of said voltage reference circuit and AC voltage level of said AC power source, a capacitor to initiate conduction of said AC power line control supply triac means circuit at start-up, and a resistor to limit current applied to said line control triac.
- 15. The voltage regulator means circuit of Claim 13 wherein output voltage is regulated to maintain output voltage between 11.0 volts and 12.5 volts.
 - 16. The voltage regulator means circuit of Claim 13 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit.
 - 17. The voltage regulator means circuit of Claim 13 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit comprising a a linear type power supply.
 - 18. The voltage regulator means circuit of Claim 13 wherein said AC power source step-down transformer is a component of a 115 V AC to 480 V AC power supply unit comprising a switching type power supply containing a pulse-width modulator.
 - 19. The voltage regulator means circuit of Claim 13 wherein output of said AC power source is an AC voltage.

20. The voltage regulator means circuit of Claim 13 wherein output of said AC power source is a DC voltage.
21. The voltage regulator means circuit of Claim 13 wherein said power line control triac is an optoisolator triac driver.
22. The voltage regulator means circuit of Claim 13 wherein said voltage sensing means circuit comprises a full-wave bridge rectifier circuit of four diodes, a spike filter capacitor across output of said full wave bridge rectifier circuit and a filter capacitor across output of said step-down transformer to provide a pulsing DC voltage to said soft start lamp circuit and to said DC voltage reference means oscillator circuit.
23. The voltage regulator means circuit of Claim 13 wherein internal voltage level of said voltage regulator means circuit is determined by component values of said soft start control circuit components and component values of said DC voltage reference means oscillator circuit components.
24. The voltage regulator means circuit of Claim 13 wherein voltage output of said 115 V AC to 480 AC power supply is regulated to maintain a 11.0 to 12.5 V AC as measured against an internal voltage level of said voltage reference means oscillator circuit.
25. The voltage regulator means circuit of Claim 13 wherein output voltage of said 115 V AC to 480 V AC power supply is regulated to maintain an output voltage of 11.6 volts, within the range of from 11.0 to 12.5 volts.